

## West End Farm Bill Range of Variation Analysis

The primary objectives of the West End Farm Bill project are 1) to reduce the threat of mortality from imminent insect and disease epidemics, and 2) to provide for public and firefighter safety and protect values at risk in the Wildland Urban Interface (WUI). Therefore, the emphasis of this project is to recommend stand treatments that achieve those objectives rather than focusing on restoring stand structure to levels within historic ranges. For some stands, the best prescription may be to remove overstory grand fir that is either currently under attack by bark beetles or is at risk of attack, providing a potential food source that would further boost the beetle epidemic.

The current condition of forest stands was compared to the historic range of variation (HRV) for stands in the Blue Mountains (Powell, 1998). Stands in multiple surrounding watersheds (29,520 acres) were analyzed to capture variation beyond the edge of the project area and to represent the landscape forest condition. Current stand conditions in potential vegetation groups (PVG) were analyzed in terms of species composition, stand density, and forest structural stages, as shown in Tables 1-4.

The dry upland PVG is outside the historical range of variation in species composition, density and forest structural stage. The dry upland forest has a reduced component of ponderosa pine and western larch but has an increase in Douglas-fir and grand fir (see Table 1). This is a direct result of nearly 100 years of fire suppression, permitting shade tolerant species to proliferate in the understory. The increase in grand fir indicates less stand resiliency to fire and drought. Table 2 shows a 35 percent increase in high-density stands in the dry upland PVG type, indicating more of the landscape is at risk to bark beetles and other disturbance agents.

Future treatments should reduce grand fir in dry forests to lower the departure from HRV. Removing the grand fir overstory and planting ponderosa pine and western larch would move the forest closer to desired future conditions for resiliency to fire, drought, attacks from insects, and root disease. Reducing stand density and removing ladder fuels will reduce the risk of crown fire and decrease inter-tree competition for nutrients, light, and soil moisture.

**Table 1: Comparison of the historical range of variability and current conditions for species composition (forest vegetation cover types), expressed as percentages by potential vegetation group (PVG).**

Forest Cover Type	Dry Upland PVG			Moist Upland PVG		
Species	HRV (%)	Current (%)	HRV Status (%)	HRV (%)	Current (%)	HRV Status (%)
JUOC	0-5	0.9	within	0	0	within
PIPO	50-80	46	below	5-15	6	within
PSME	5-20	27	above	15-30	18	within
LAOC	1-10	0	below	10-30	1	below
PICO	0	0	within	25-45	4	below
PIMO3	0-5	0	within	0-5	0	within

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ABGR	1-10	12	above	15-30	70	above
PIAL	0	0	within	0	0	within
ABLA/PIEN	0	0	within	1-10	1	within

**Table 2. Comparison of the historical range of variability and current conditions for stand density classes within potential vegetation groups.**

Stand Density									
PVG	Low Density (% of stands)			Medium Density (% of stands)			High Density (% of stands)		
	HRV	Current	Status	HRV	Current	Status	HRV	Current	Status
Dry UF	40-85	34	Below	15-30	16	Within	5-15	50	Above
Moist UF	20-40	47	Above	25-60	49	Within	15-30	4	Below

**Table 3. Comparison of the historical range of variability and current conditions for OFMS and OFSS structural stages.**

Forest Structural Stage						
PVG	OFMS			OFSS		
	HRV (% of stands)	Current (% of stands)	HRV Status (% of stands)	HRV (% of stands)	Current (% of stands)	HRV Status (% of stands)
Dry UF	1-15	21	Above	40-65	1	Below
Moist UF	15-20	64	Above	10-20	0	Below

**Table 4. Comparison of the historical range of variability and current conditions for SI, SE, and UR structural stages.**

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Forest Structural Stage									
PVG	SI			SE			UR		
	HRV (% of stands)	Current (% of stands)	HRV Status	HRV (% of stands)	Current (% of stands)	HRV Status	HRV (% of stands)	Current (% of stands)	HRV Status
<b>Dry UF</b>	15-30	13	Below	10-20	18	Within	10-20	47	Above
<b>Moist UF</b>	20-30	7	Below	20-30	8	Below	15-25	22	Within

The dry forest structural stages are not aligned with HRV. Historically, 41-80% of all Dry Upland Forest was in old forest structure. Currently, only 22% of dry forests are in old structure. Old forest multi- strata (OFMS) and the understory re-initiation (UR) structural stages are overrepresented while old forest single- stratum (OFSS) is extremely under-represented at only 1%. Table 3 suggests past forest management is trending dry forest towards OFMS rather than OFSS. Management strategies should aim to move most dry forest types on a trajectory toward OFSS. The large percentage of stands in the UR structural stage (see Table 4) should be a focus of such strategies.

The moist upland forest PVG is also departed from HRV in species composition, stand density and forest structure. Moist forest types have progressed to late successional stages where grand fir is the dominant species. Table 1 shows that grand fir cover types currently comprise over 70% of moist forest types compared to 15-30% historically.

Moist forests are within recommended stocking density guidelines, as shown in Table 2, but have a high proportion of grand fir which is poorly adapted to extended drought, resulting in lowered resistance to bark beetles.

Current forest structure is not aligned with historic structure. The old forest structure of the moist upland forest has an excess of stands in OFMS and a shortage of stands in OFSS. Stands in the stem exclusion (SE) and stand initiation (SI) structure classifications are also below HRV. These conditions suggest that decades of successful fire suppression have prevented stand replacing fire events, allowing moist forests to develop into multi-storied stands dominated by grand fir, with little structural diversity across the landscape.

The stands in the West End project area are deficit in OFSS for both the dry and moist upland forests, which means Scenario A of the Interim Direction for Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales (commonly known as Eastside Screens) applies to the project area. Commercial harvest is prohibited in OFSS since it is below HRV. Under Scenario

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A, timber stand improvement activities, such as non-commercial thinning are allowed if ~~they~~ move~~they move~~ stands towards HRV. Additionally, commercial harvest may take place in late and old structural stages (LOS) at or above HRV, if there is no net loss of LOS. Sale of green trees greater than 21” in diameter is prohibited. Stands in the West End project area are above HRV for OFMS for both dry and moist upland forest.

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Map 1. Structure types of the West End project area

